

CLAIMS

What is claimed is:

1. A fuel filter assembly comprising:
 - a) a housing comprising a base and a housing cover, said housing having an inlet
5 and an outlet;
 - b) a filter element disposed within said housing, said filter element having a collar with an opening formed therethrough; and
 - c) a restriction sensor comprising a probe for insertion into said collar.
2. The filter assembly of claim 1, wherein said restriction sensor comprises a display
10 face and a movable needle operatively attached to said display face for displaying output from said sensor.
3. The filter assembly of claim 1, wherein said housing cover has a threaded opening formed therein, and said restriction sensor comprises a threaded base portion which fits inside of said threaded opening in said housing.
- 15 4. The filter assembly of claim 3, wherein said restriction sensor comprises an electronic pressure sensor.
5. The filter assembly of claim 4, wherein said restriction sensor comprises a first pressure sensor for sensing fluid pressure outside the filter element, and a second pressure sensor for sensing pressure inside the filter element.
- 20 6. A fuel filter assembly comprising:
 - a) a housing comprising
a base having an inlet and an outlet, and

a housing cover which is removably attachable to said base, said housing cover having a threaded opening formed therein;

b) a filter element disposed within said housing, said filter element comprising filter media and first and second end caps attached to opposite ends of said filter media, said end caps being formed from a flexible elastomeric material, each of said end caps having a respective opening formed centrally therethrough, one of said end caps having a raised collar surrounding said opening; and

c) a restriction sensor, comprising

a probe for insertion into the filter element through said collar; and

a threaded base portion which fits inside of said threaded opening of said housing cover.

7. The filter assembly of claim 6, wherein said restriction sensor comprises a display face and a movable needle operatively attached to said display face for displaying output from said sensor.

8. The filter assembly of claim 7, wherein said housing cover has a threaded opening formed therein, and said restriction sensor comprises a threaded base portion which fits inside of said threaded opening.

9. The filter assembly of claim 8, wherein said restriction sensor comprises an electronic pressure sensor.

10. The filter assembly of claim 9, wherein said restriction sensor comprises a first sensor for sensing fluid pressure outside the filter element, and a second sensor for sensing pressure inside the filter element.

11. A method of monitoring restriction in a fuel filter, comprising the steps of:

- a) sensing fluid pressure inside of a fuel filter element;
- b) sensing fluid pressure outside of said fuel filter element and comparing it to said inside pressure to determine a pressure differential; and
- c) displaying a visual warning when said pressure differential exceeds a predetermined limit.

12. The method of claim 11, wherein said visual warning is displayed on a display face of a gauge.

13. The method of claim 11, wherein said visual warning is displayed by activating a warning signal within a vehicle.

14. The method of claim 11, wherein the filter element has an end cap with a hollow opening formed therethrough, and wherein said pressure inside the filter element is sensed by a sensor on a probe which has been inserted through said hollow opening of said end cap.

15. A fuel filter element, comprising:

a filter medium arranged in a tubular shape with open ends, said filter medium having a hollow internal cavity defined therein;

first and second end caps attached to the ends of the filter medium, each of said end caps being formed from a flexible elastomeric material and having a central opening therein, the opening in the second end cap being larger than the opening in the first end cap;

wherein said first end cap has a raised collar extending around said central opening.

16. The filter element of claim 16, wherein the collar extends inwardly beyond the end of the filter medium, into the hollow internal cavity thereof.